

EXHIBIT A

(12) **United States Patent**
Copeland et al.

(10) **Patent No.:** **US 6,827,901 B2**
(45) **Date of Patent:** **Dec. 7, 2004**

(54) **AUTOMATED BIOLOGICAL REACTION APPARATUS**

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(*) **Notice:** Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 0 days.

(21) **Appl. No.:** 10/137,169

(22) **Filed:** May 2, 2002

(65) **Prior Publication Data**

US 2002/0114733 A1 Aug. 22, 2002

Related U.S. Application Data

(63) Continuation of application No. 09/931,513, filed on Aug. 16, 2001, which is a continuation of application No. 09/452,309, filed on Dec. 1, 1999, now Pat. No. 6,352,861, which is a continuation of application No. 08/906,678, filed on Aug. 5, 1997, now abandoned, which is a continuation of application No. 08/479,415, filed on Jun. 6, 1995, now Pat. No. 5,654,200, which is a division of application No. 08/352,966, filed on Dec. 9, 1994, now Pat. No. 5,595,707, which is a continuation of application No. 07/924,052, filed on Aug. 31, 1992, now abandoned, which is a continuation-in-part of application No. 07/488,601, filed on Mar. 2, 1990, now abandoned.

(51) **Int. Cl.⁷** G01N 35/00

(52) **U.S. Cl.** 422/64; 422/62; 422/67;
436/43; 436/45; 436/46; 436/54; 436/55

(58) **Field of Search** 436/43, 45, 46,
436/48, 49, 54-55; 422/62, 64, 67

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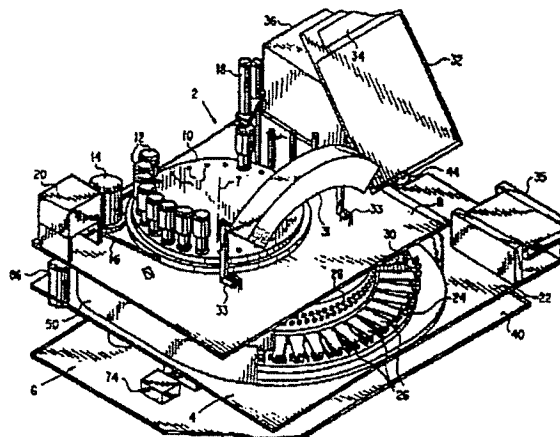
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(57) **ABSTRACT**

An automated immunostaining apparatus having a reagent application zone and a reagent supply zone. The apparatus has a carousel slide support supporting a plurality of slide supports thereon, and drive means engaging the carousel slide support for consecutively positioning each of a plurality of slide supports in the reagent application zone. The apparatus also has a carousel reagent support having a plurality of reagent container supports thereon, and drive means engaging the carousel for rotating the carousel and positioning a preselected reagent container support in the reagent supply zone. The apparatus also has a reagent delivery actuator means positioned for engaging a reagent container positioned on a container support.

45 Claims, 37 Drawing Sheets



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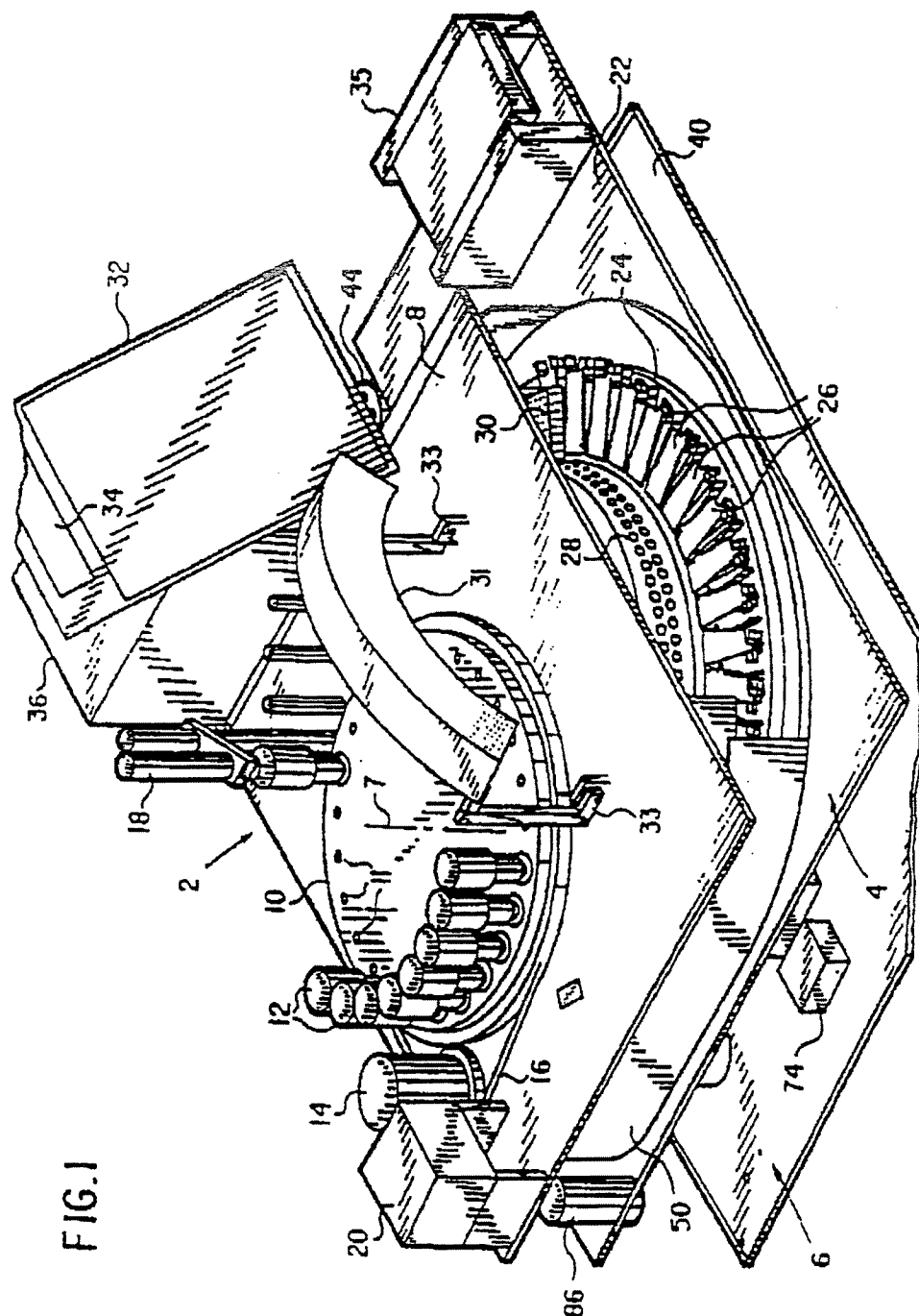
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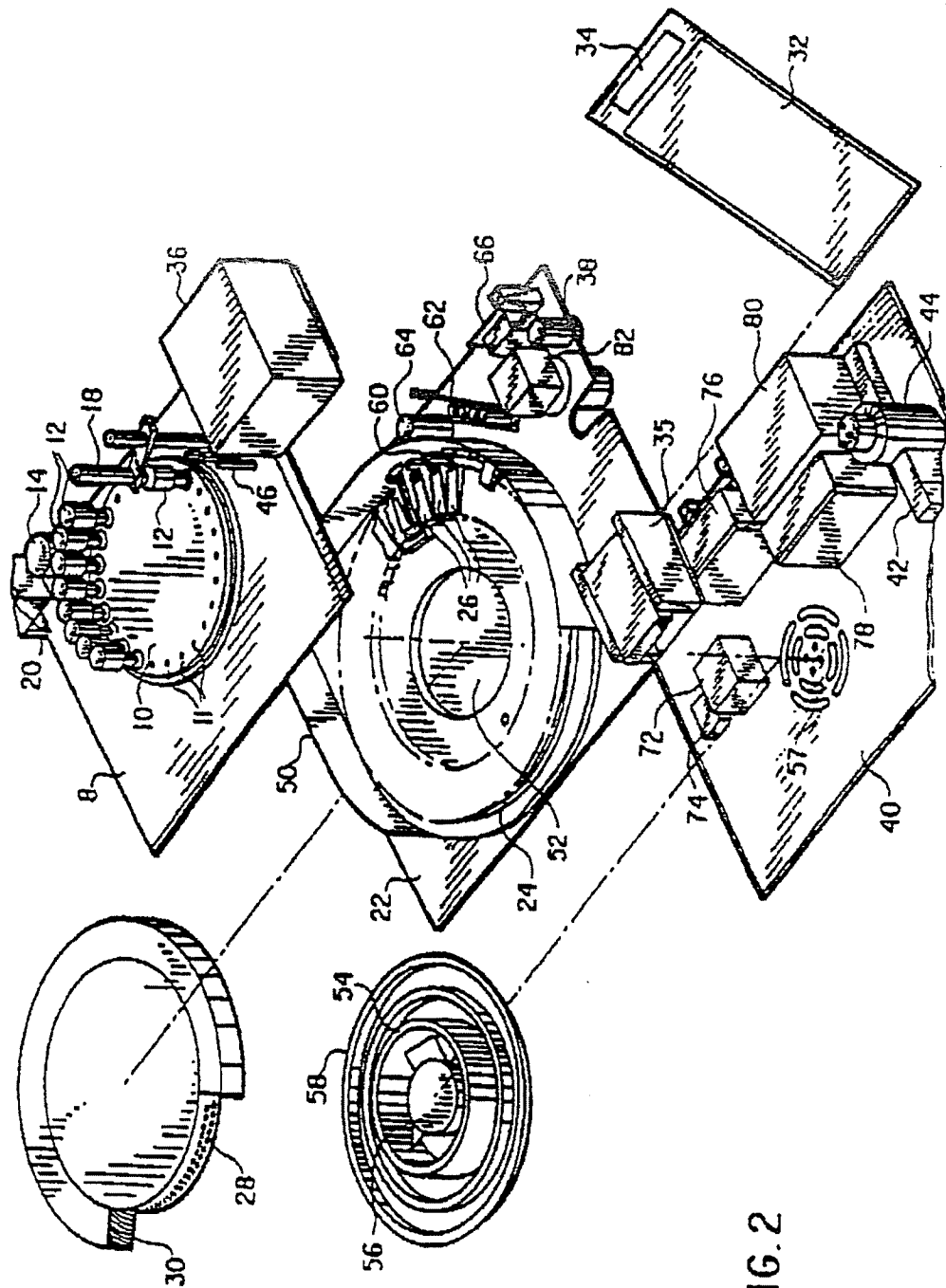
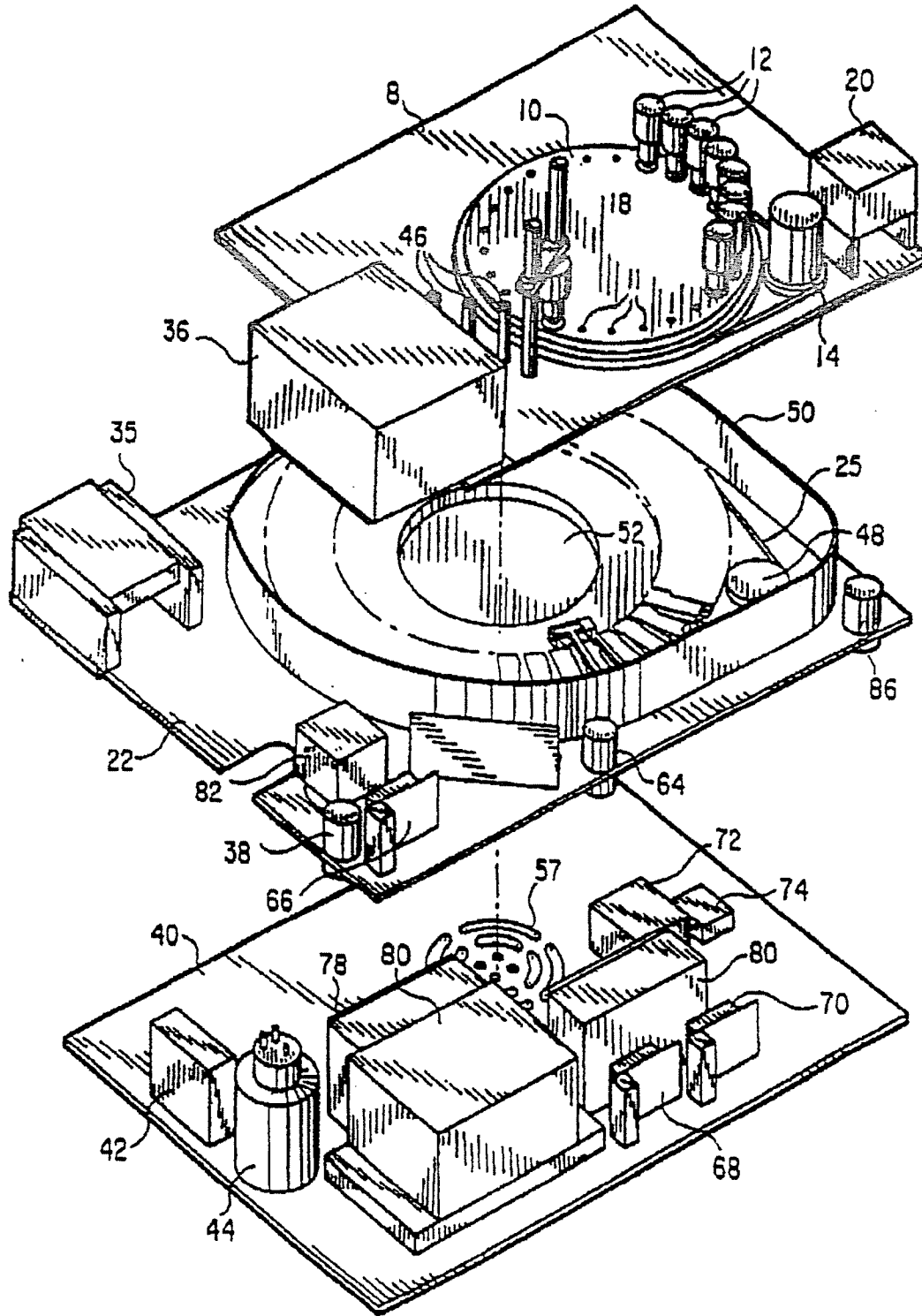


FIG. 2

FIG. 4



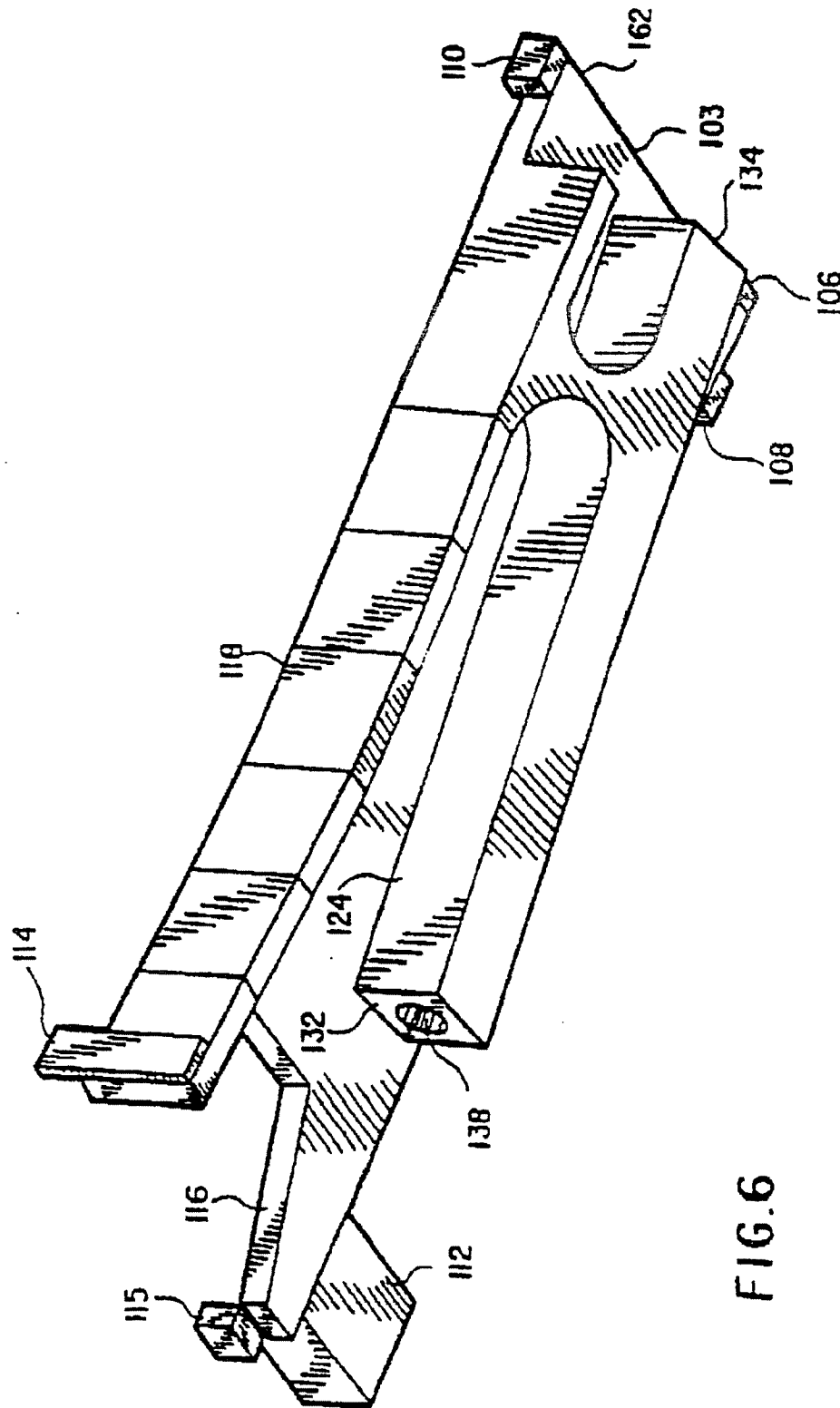


FIG. 6

FIG. 7

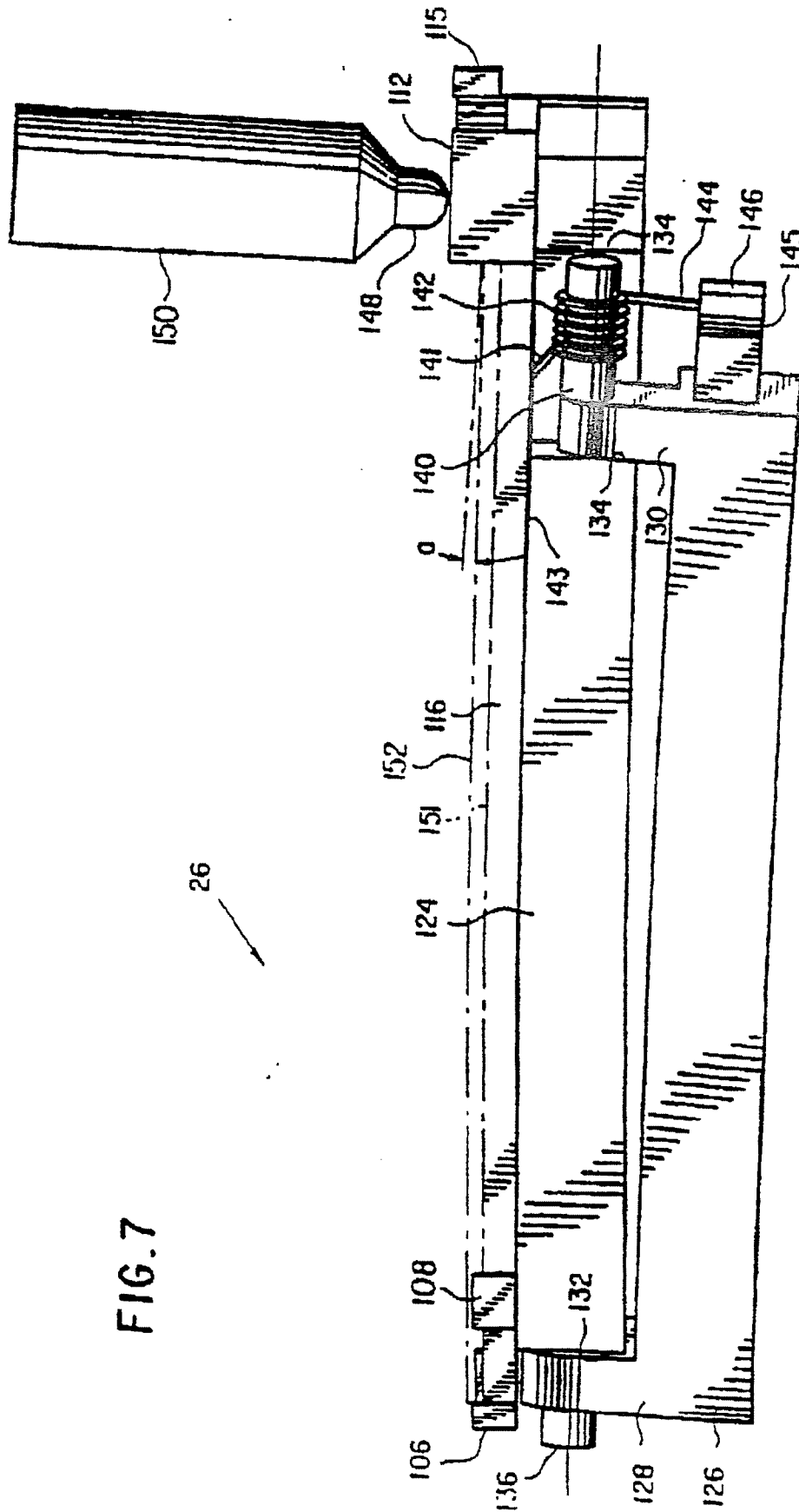
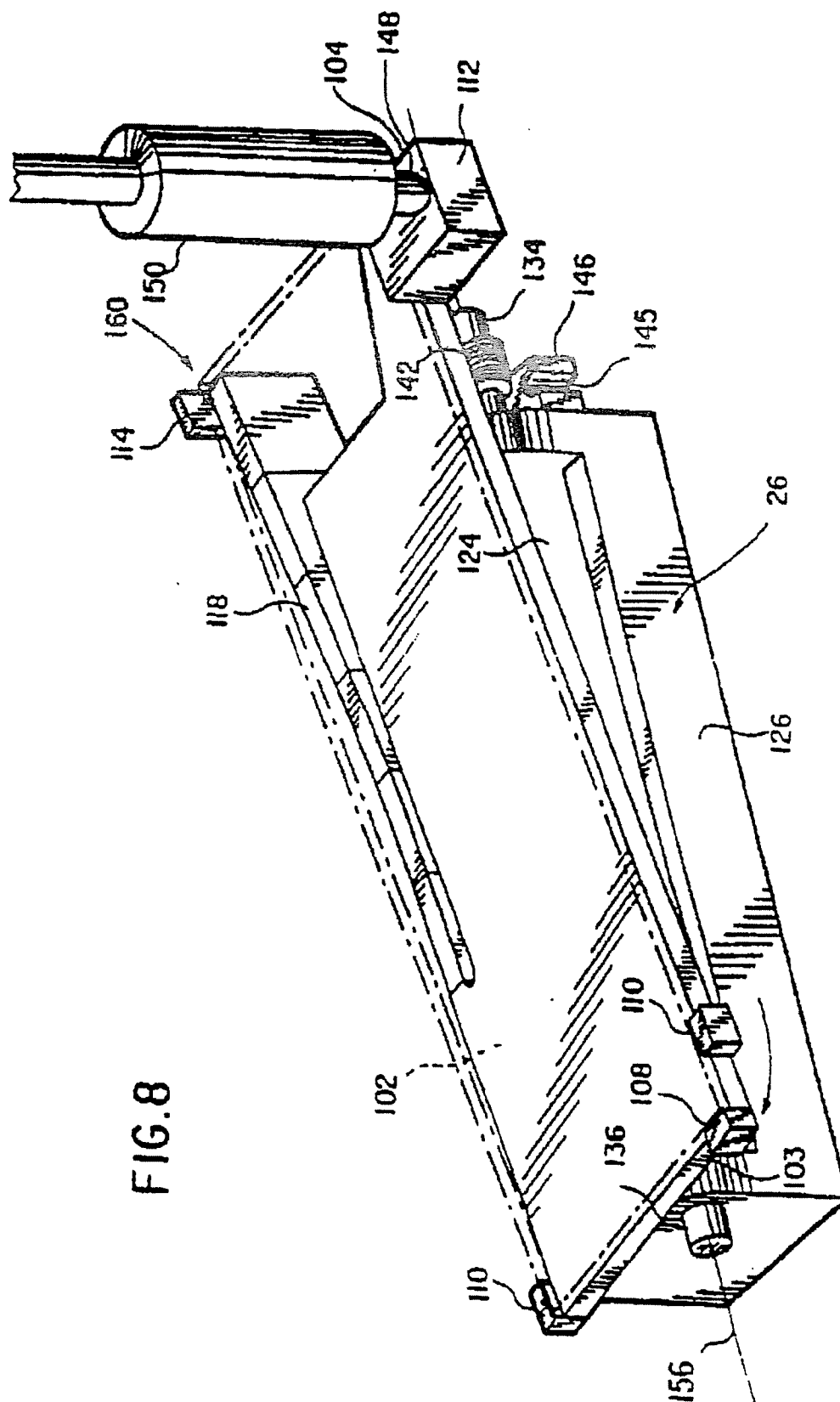


FIG. 8



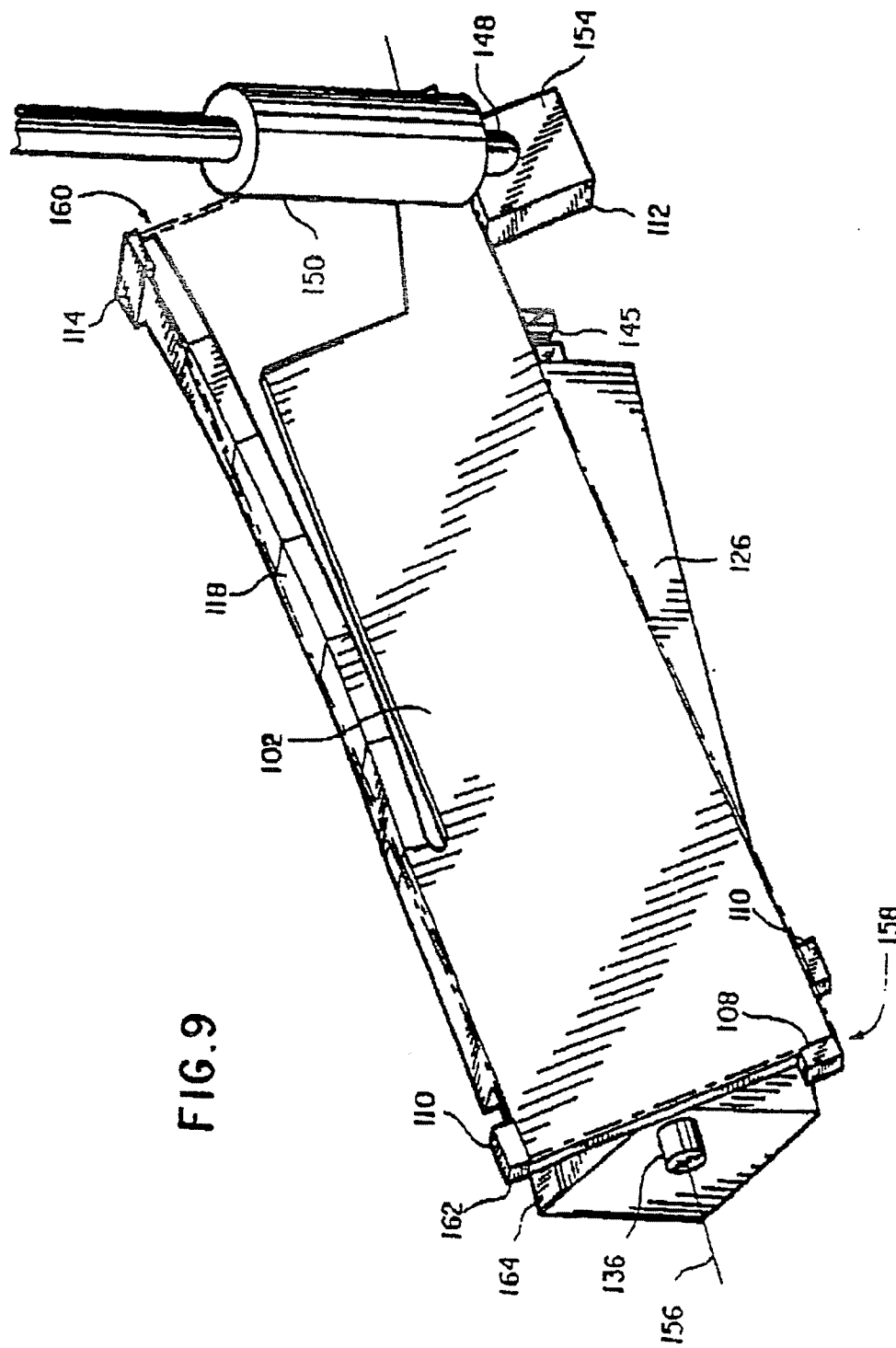
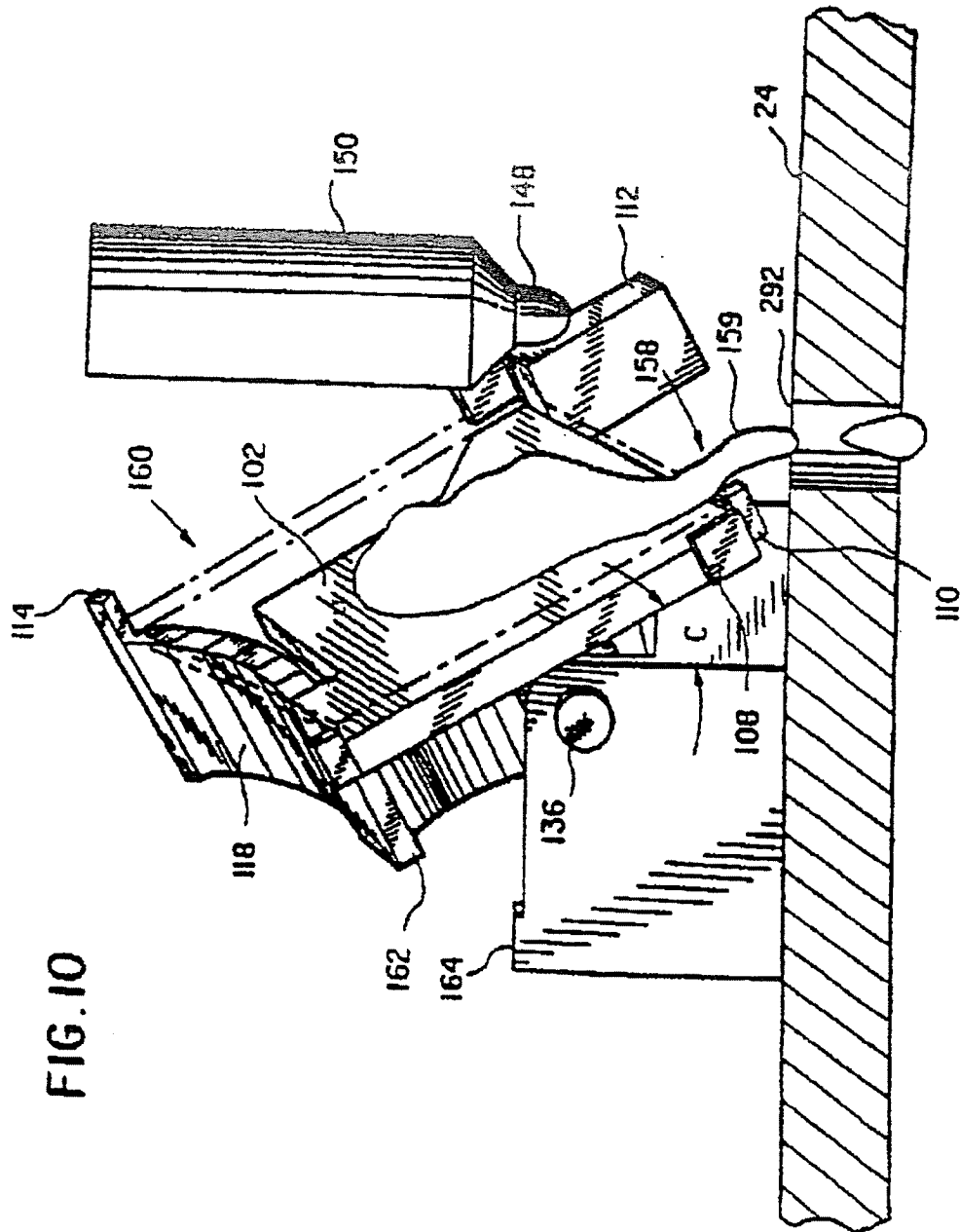
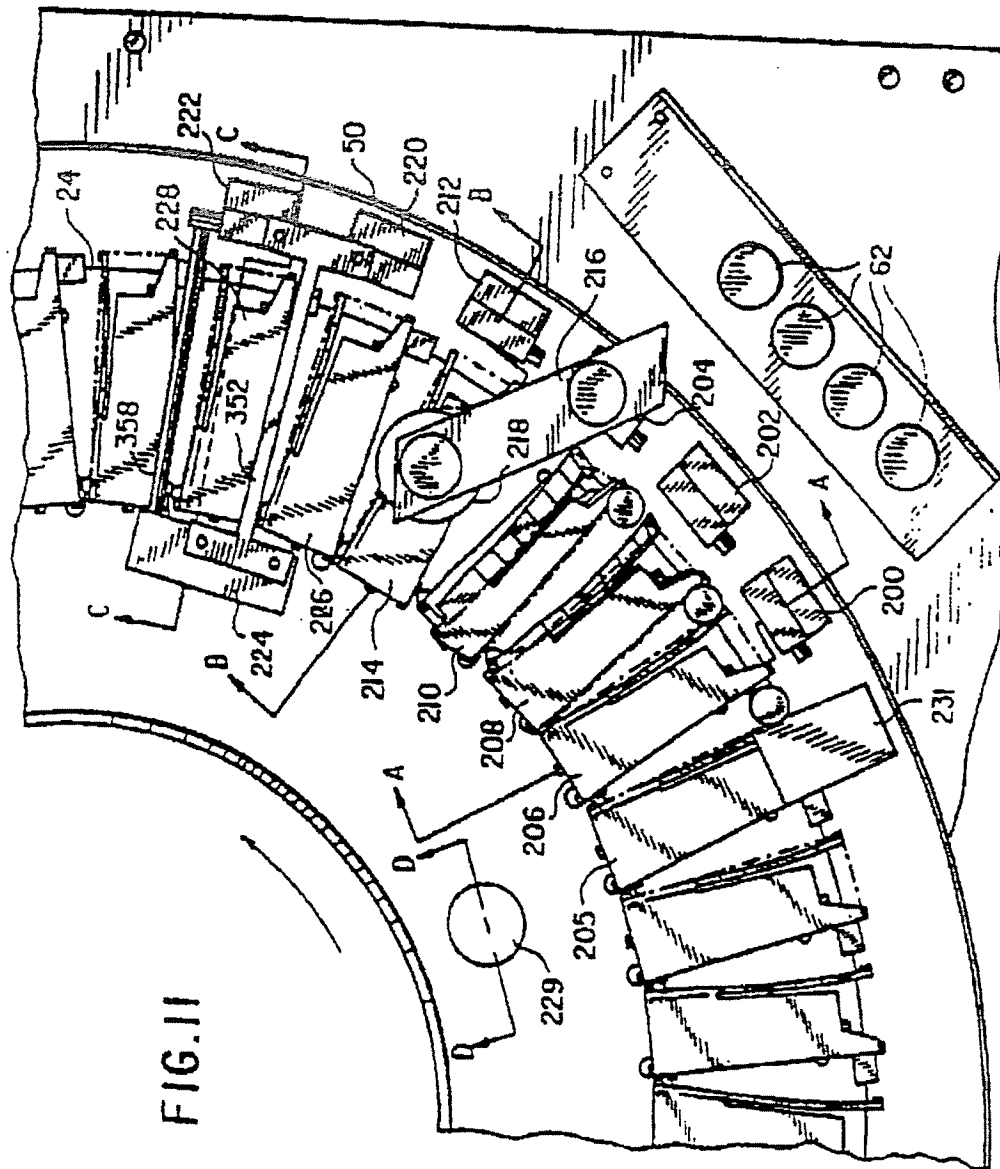


FIG. 10





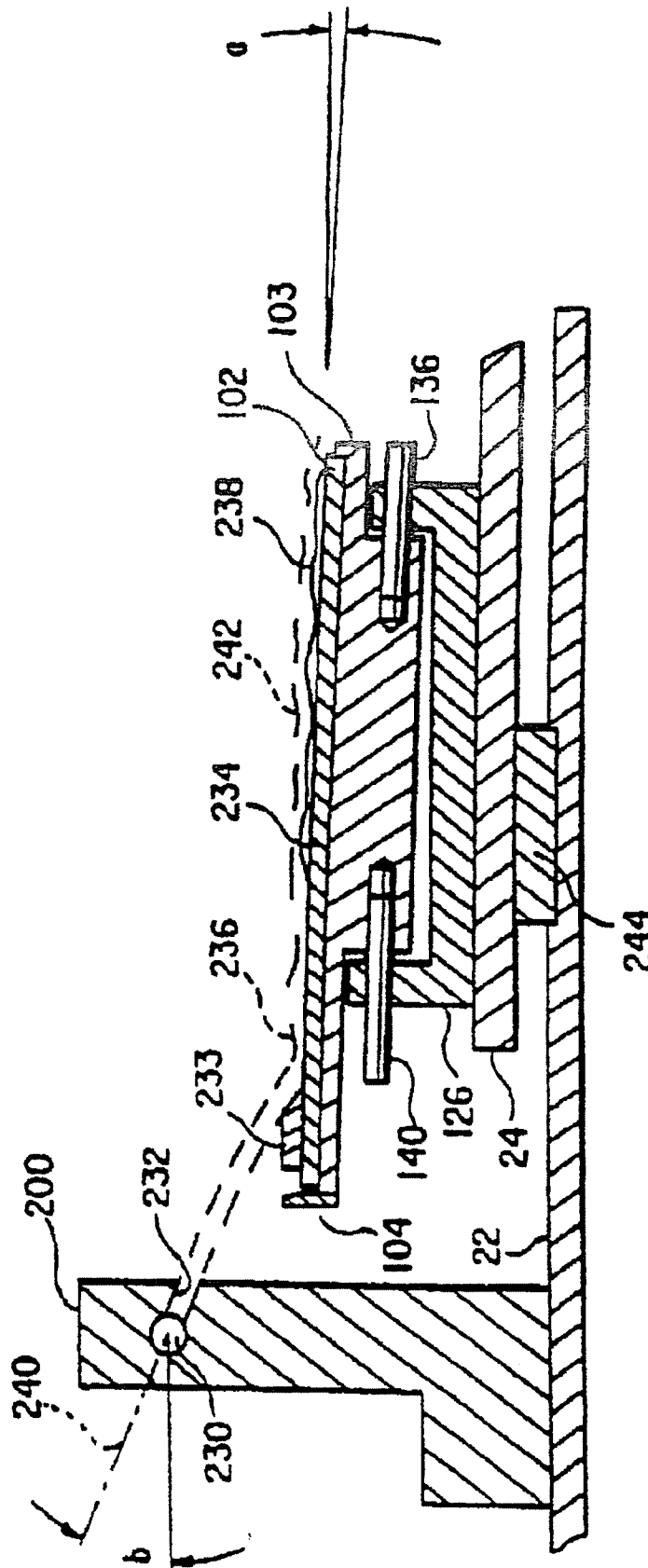


FIG. 12

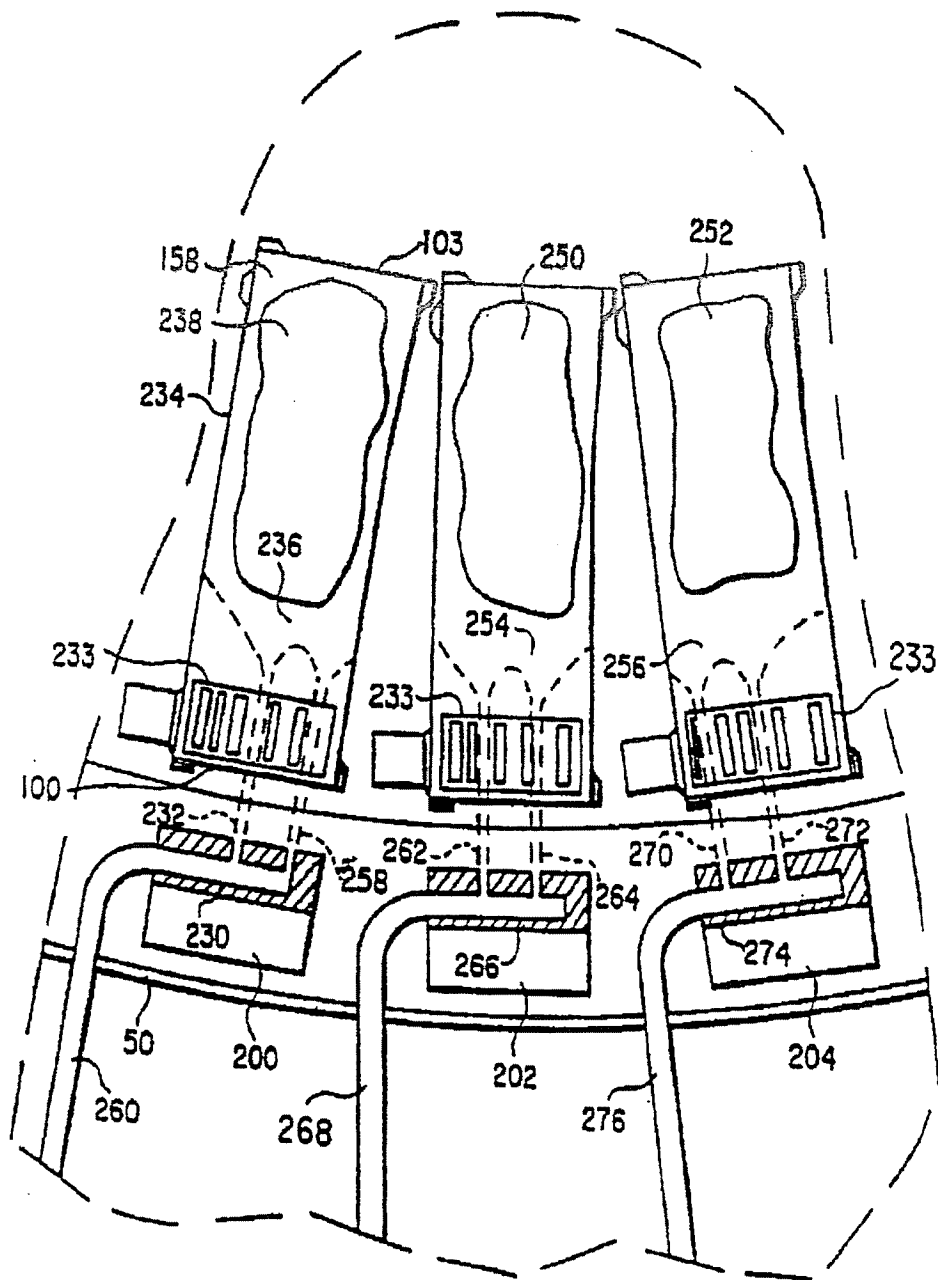


FIG. 13

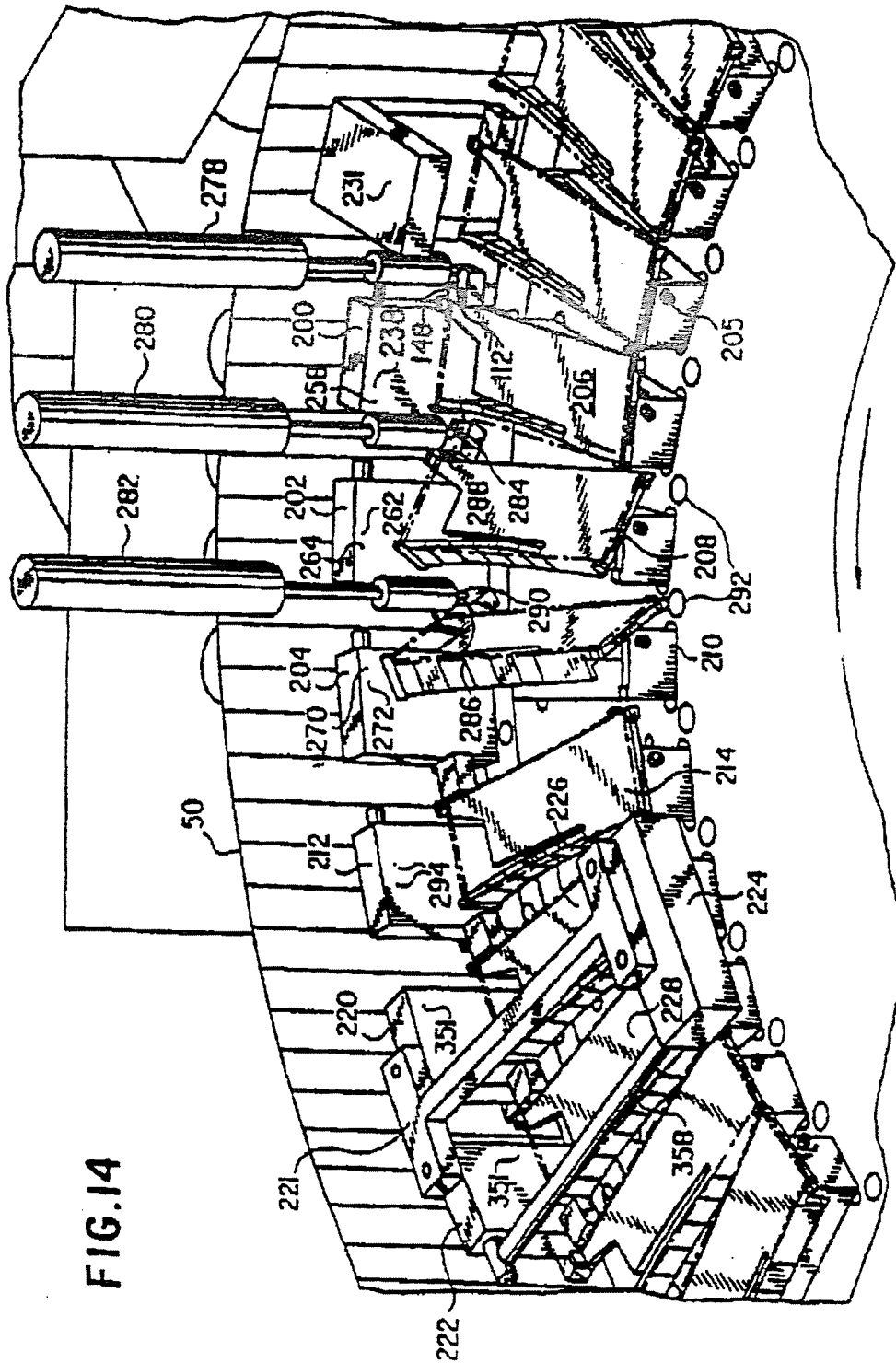


FIG. 14

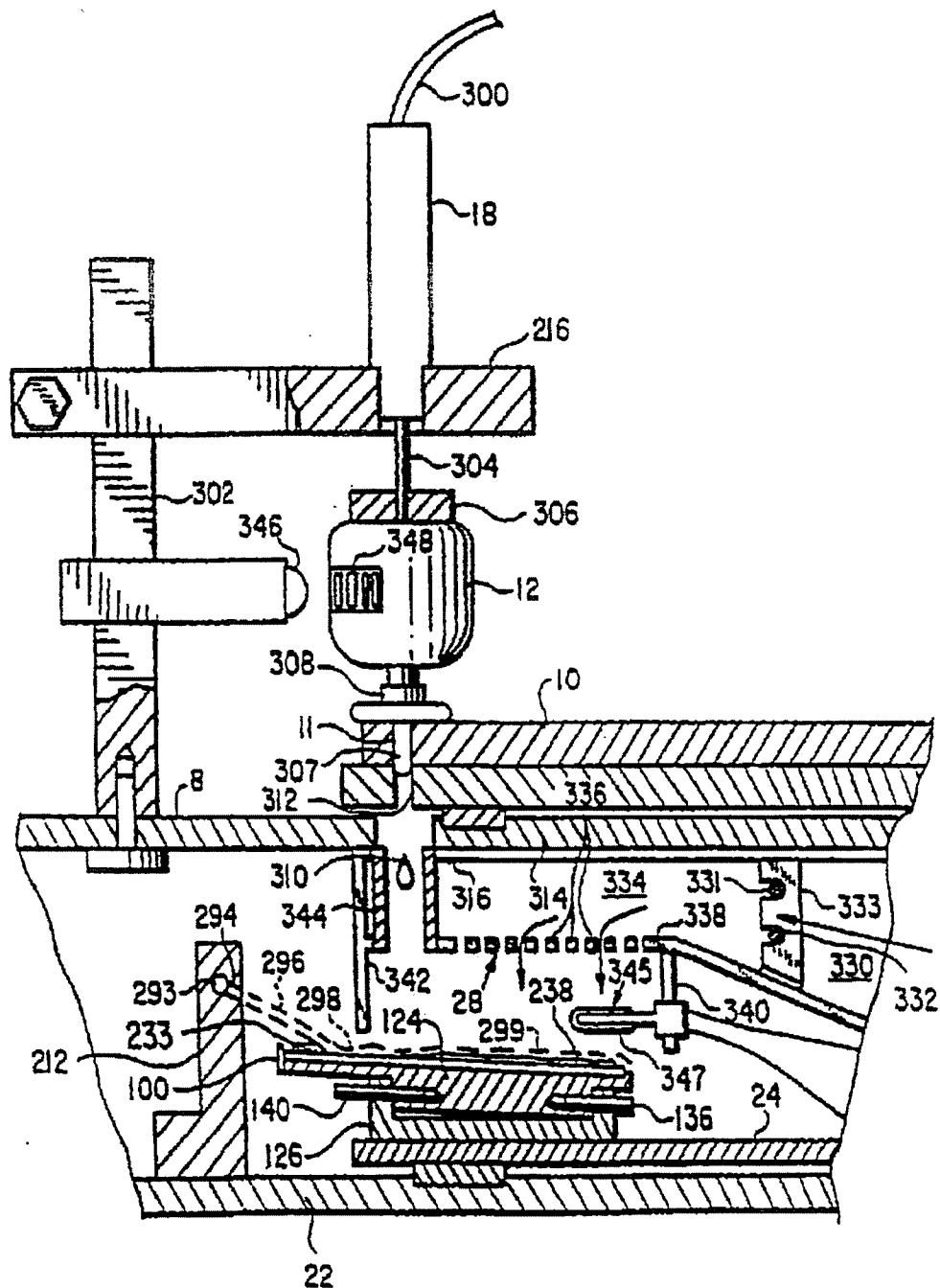
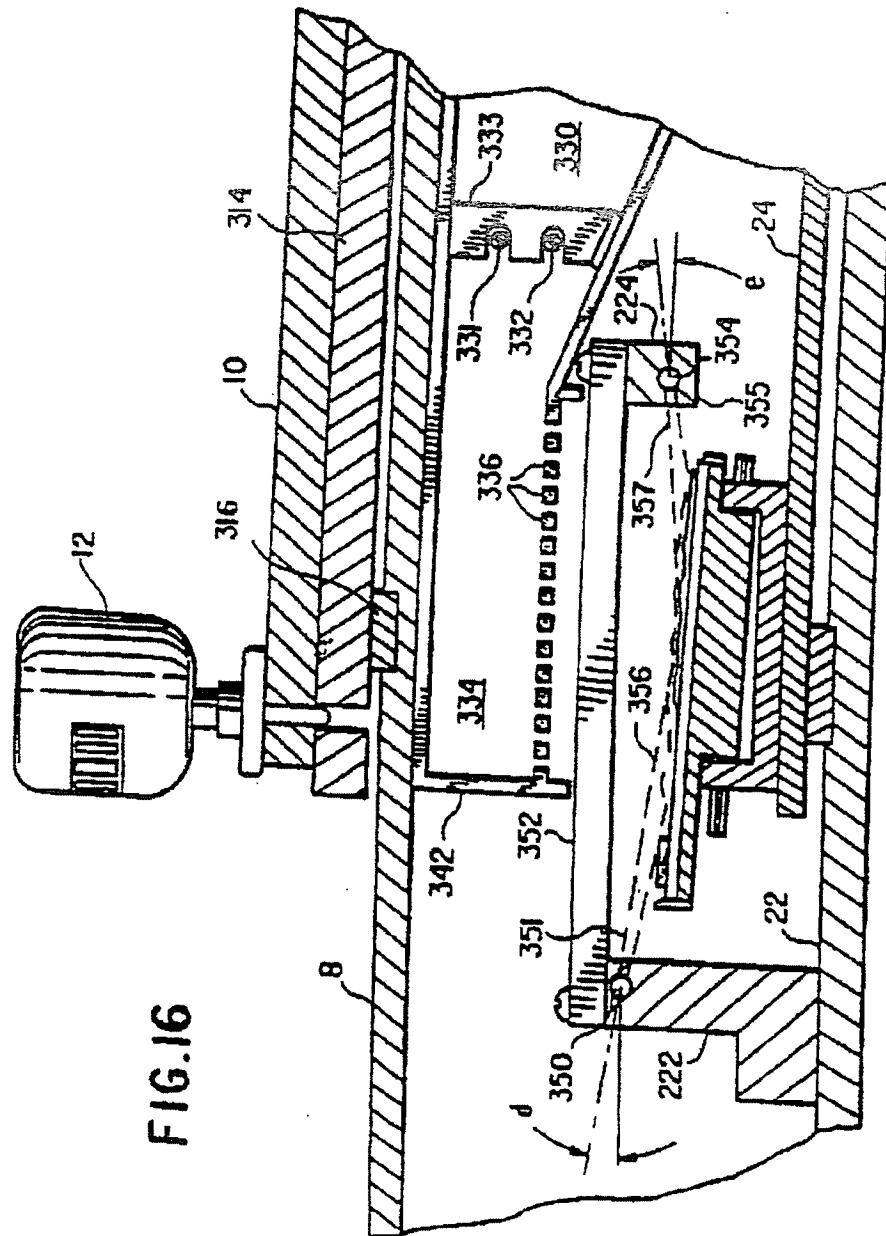


FIG. 15



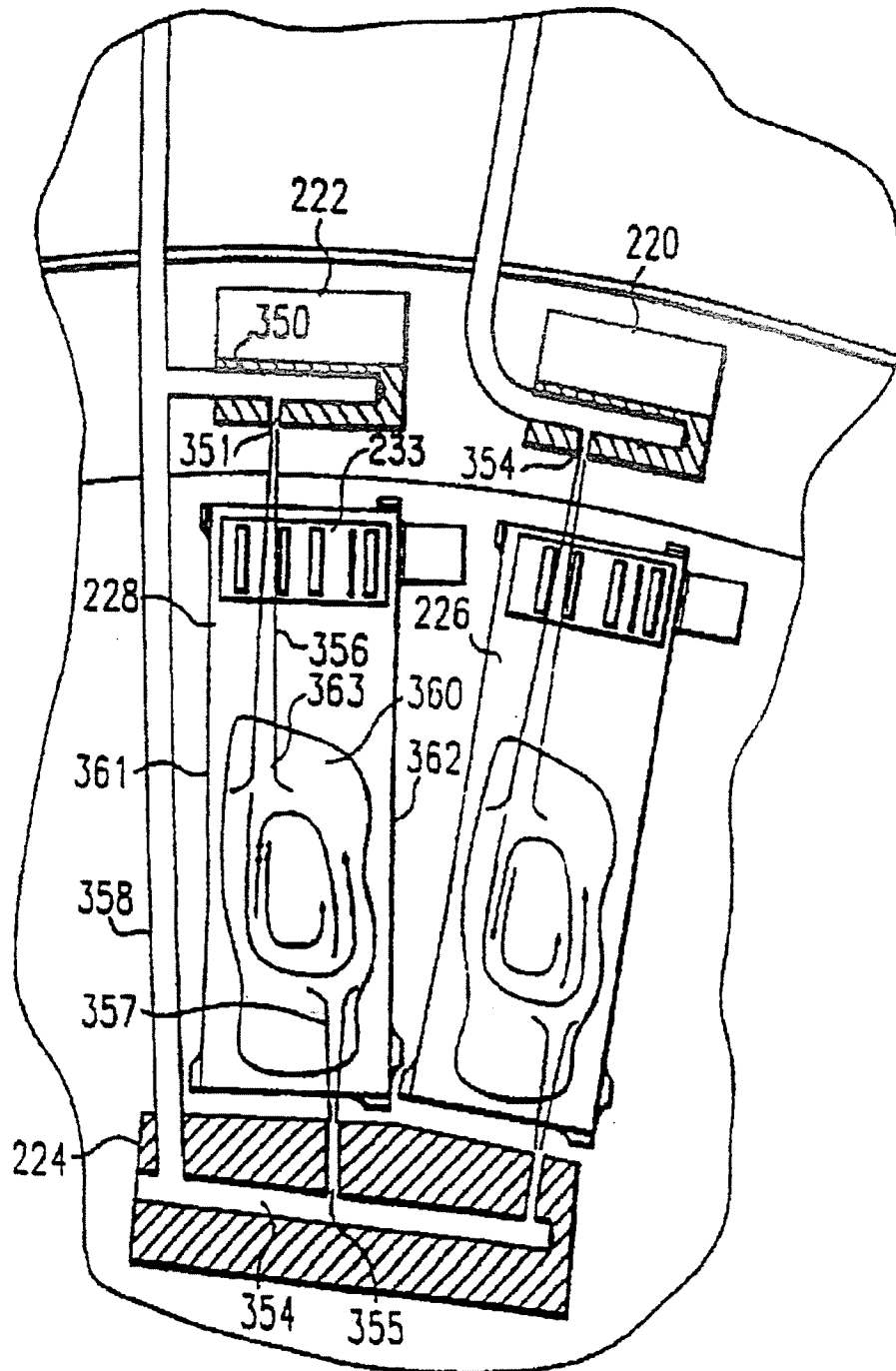


FIG. 17

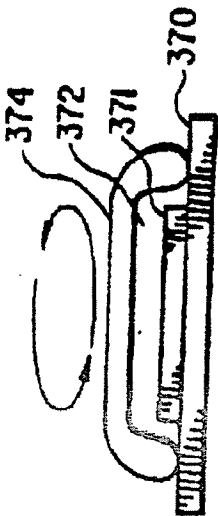


FIG. 18A

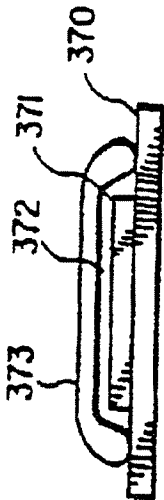


FIG. 18B

FIG. 18C

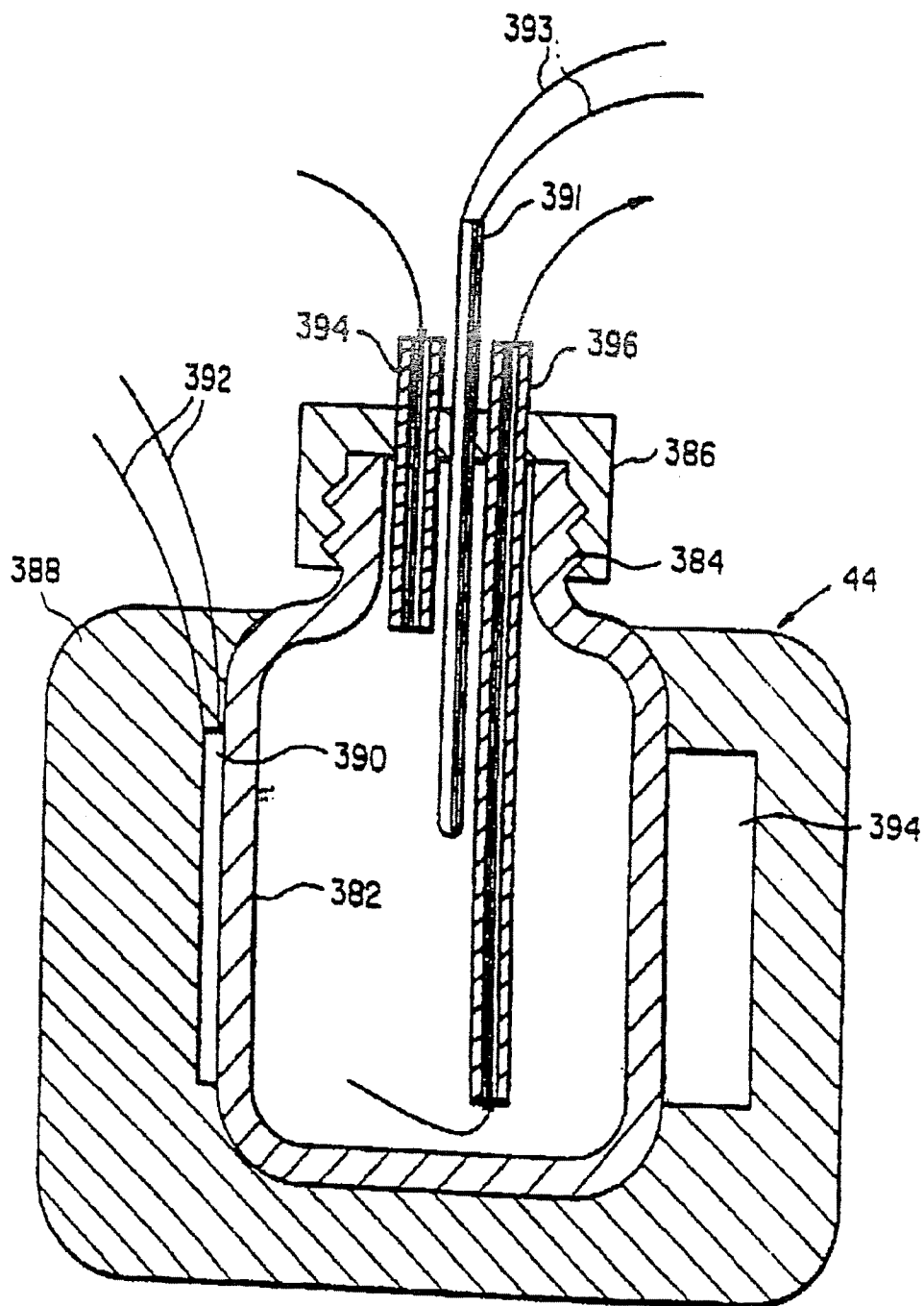


FIG. 19A

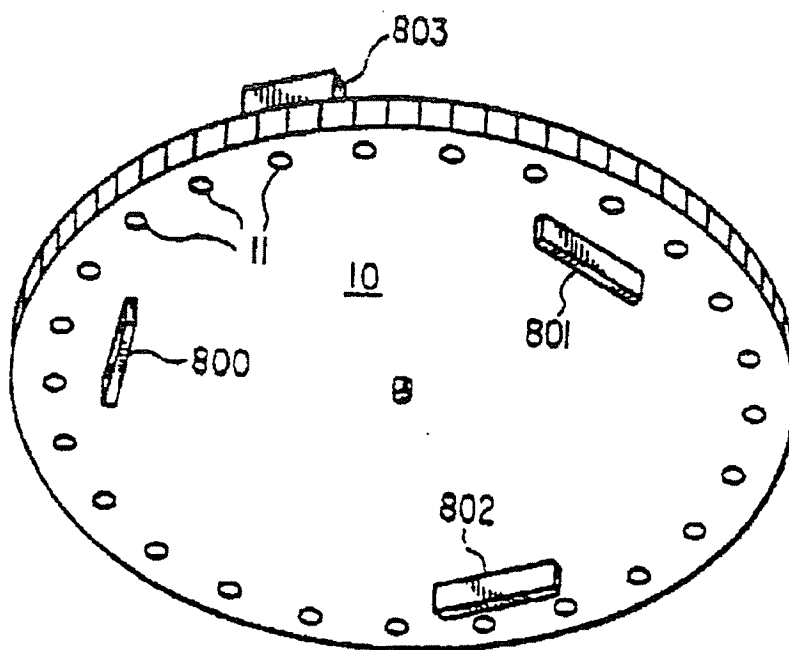


FIG. 20A

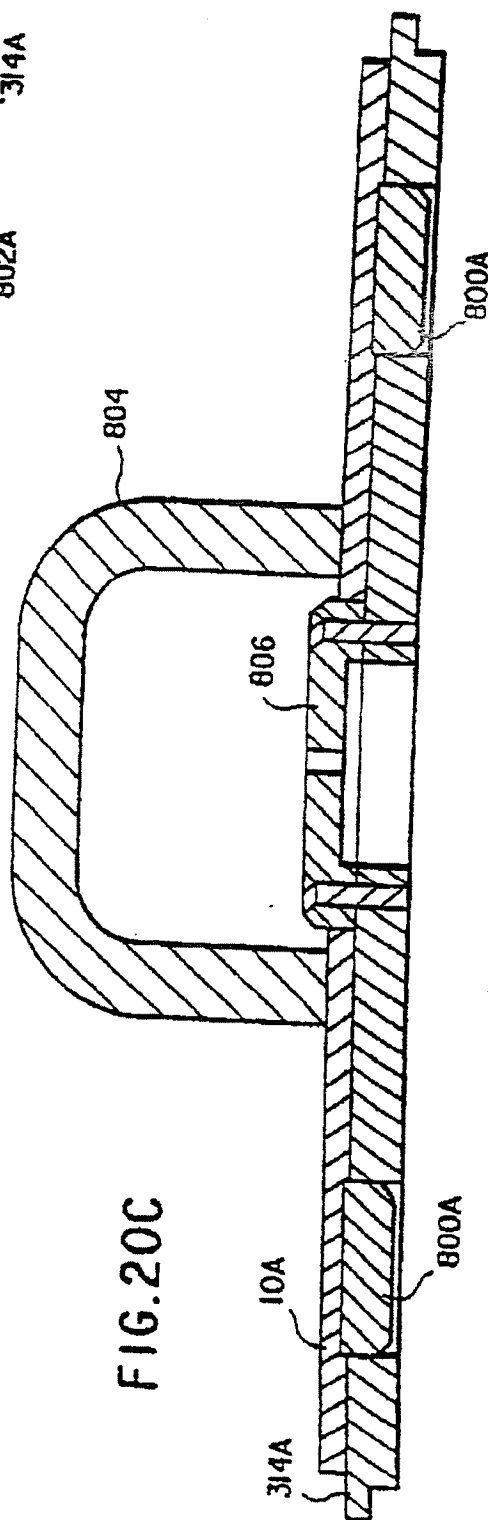
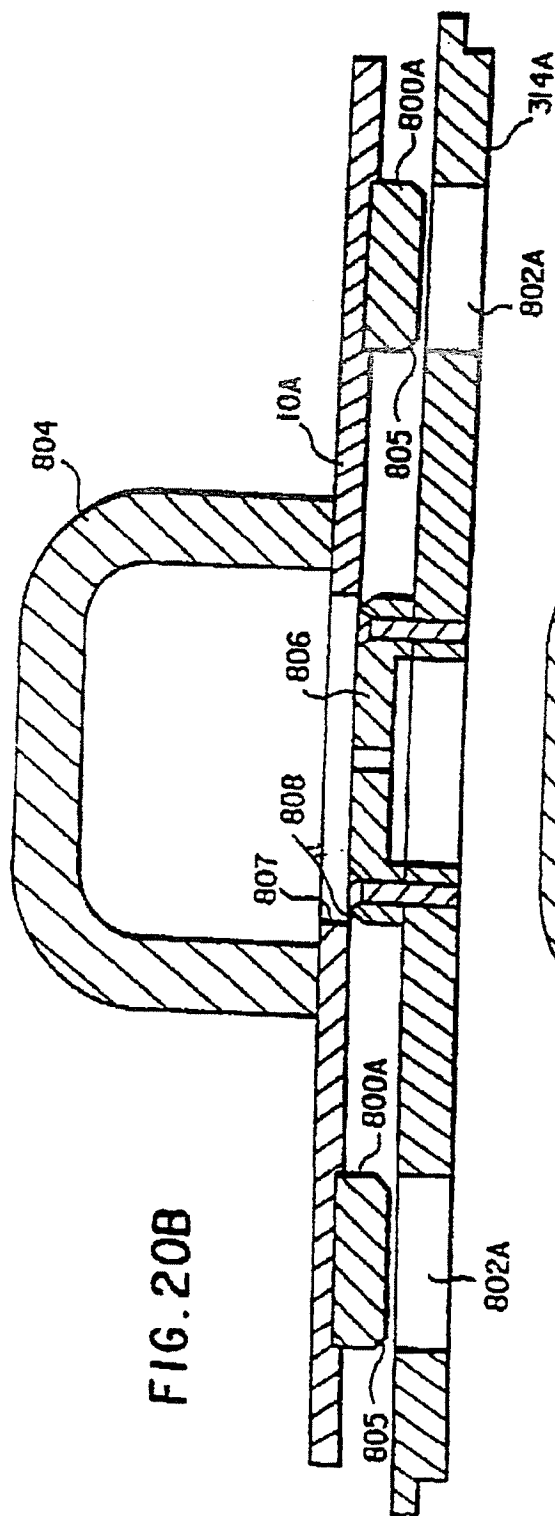
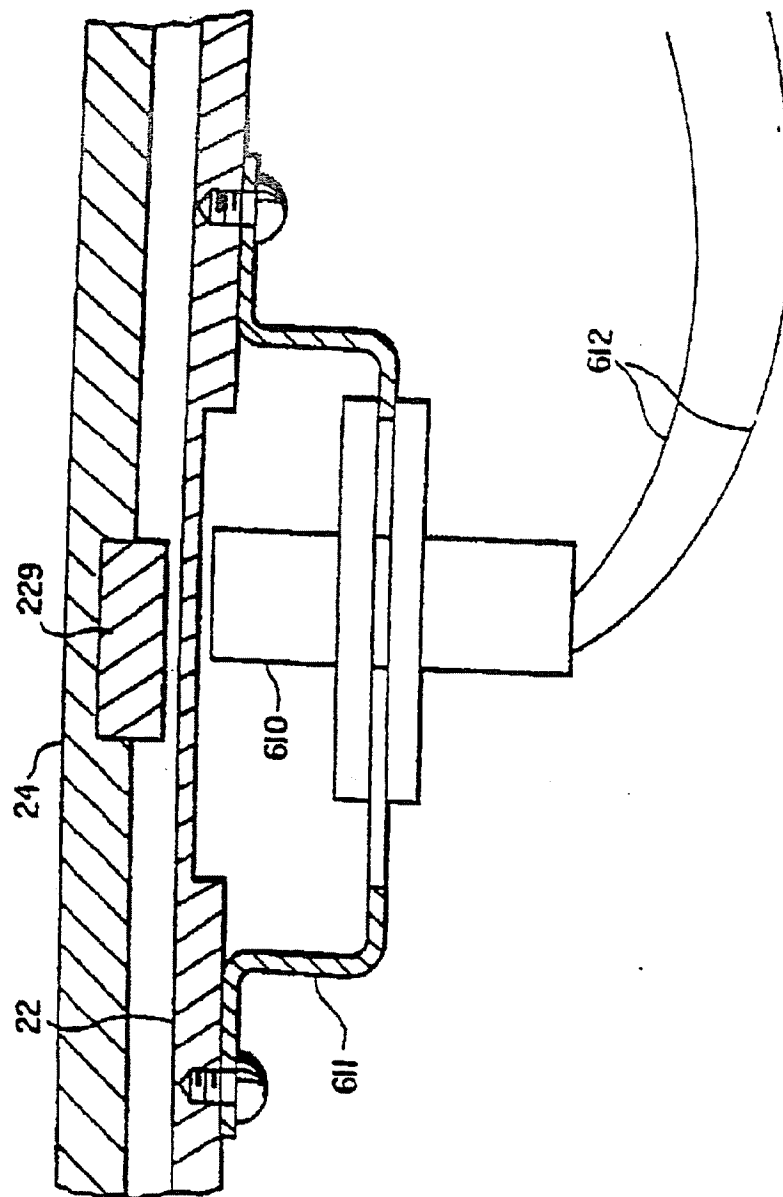


FIG. 21



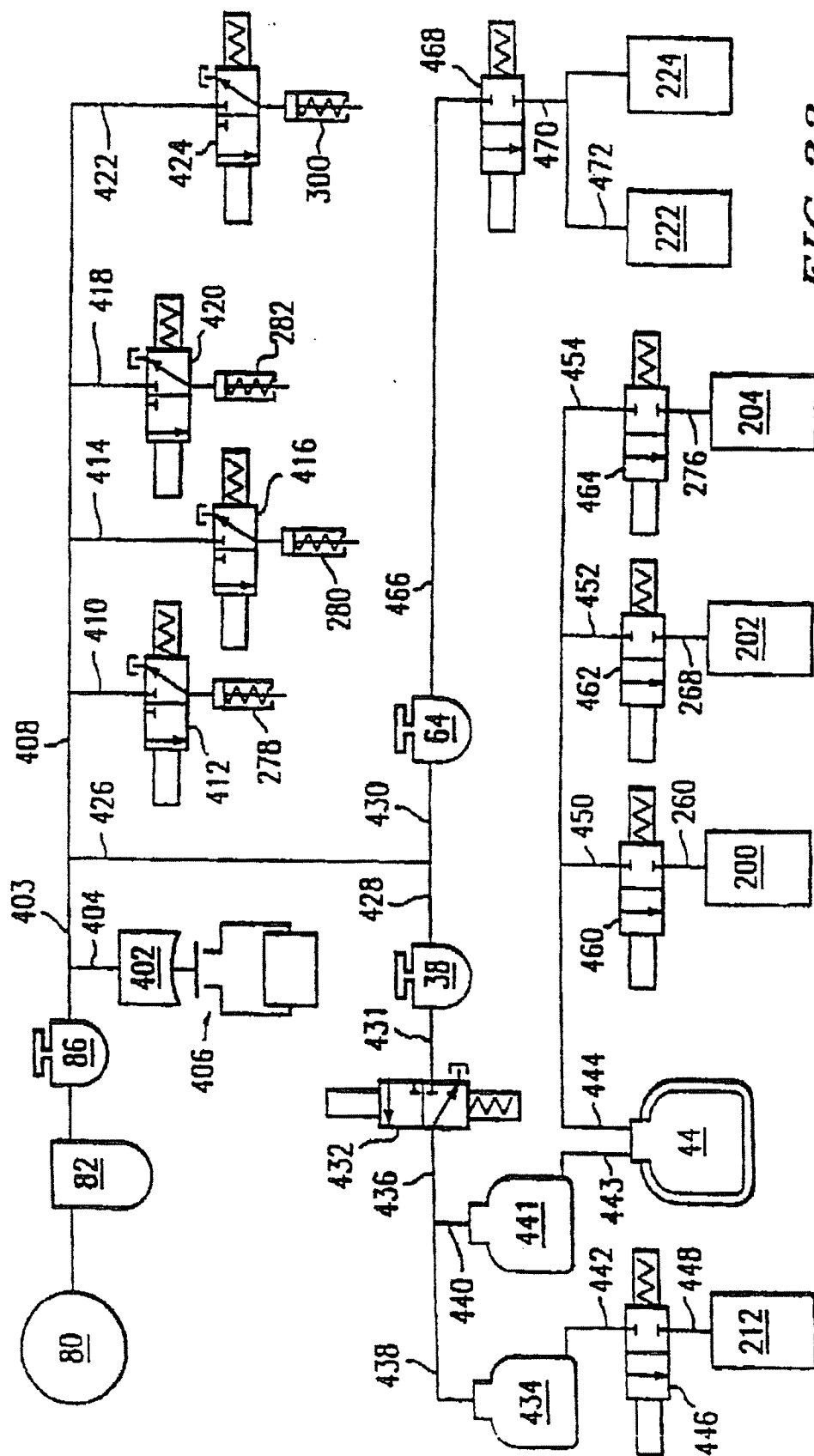


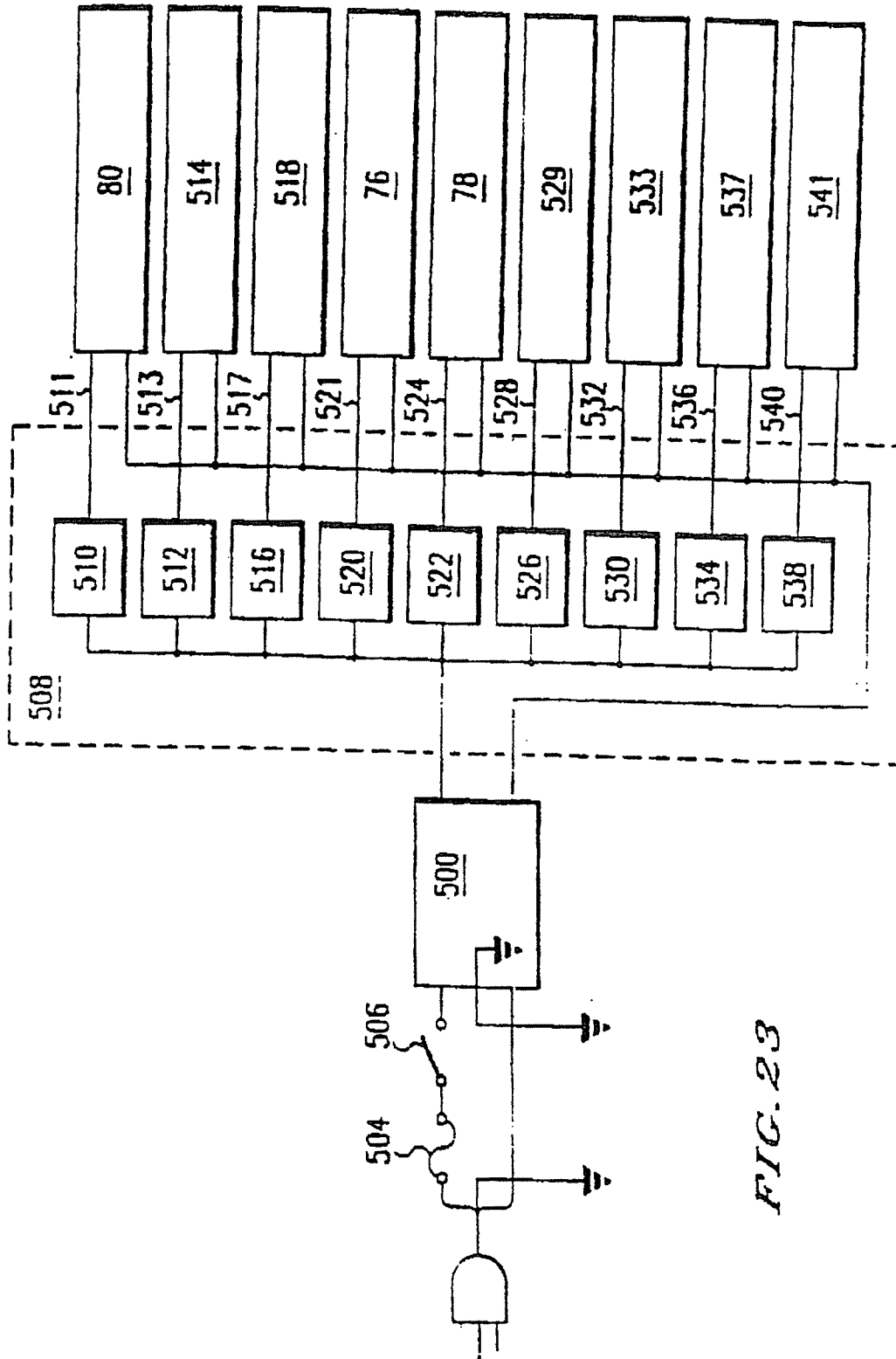
FIG. 22

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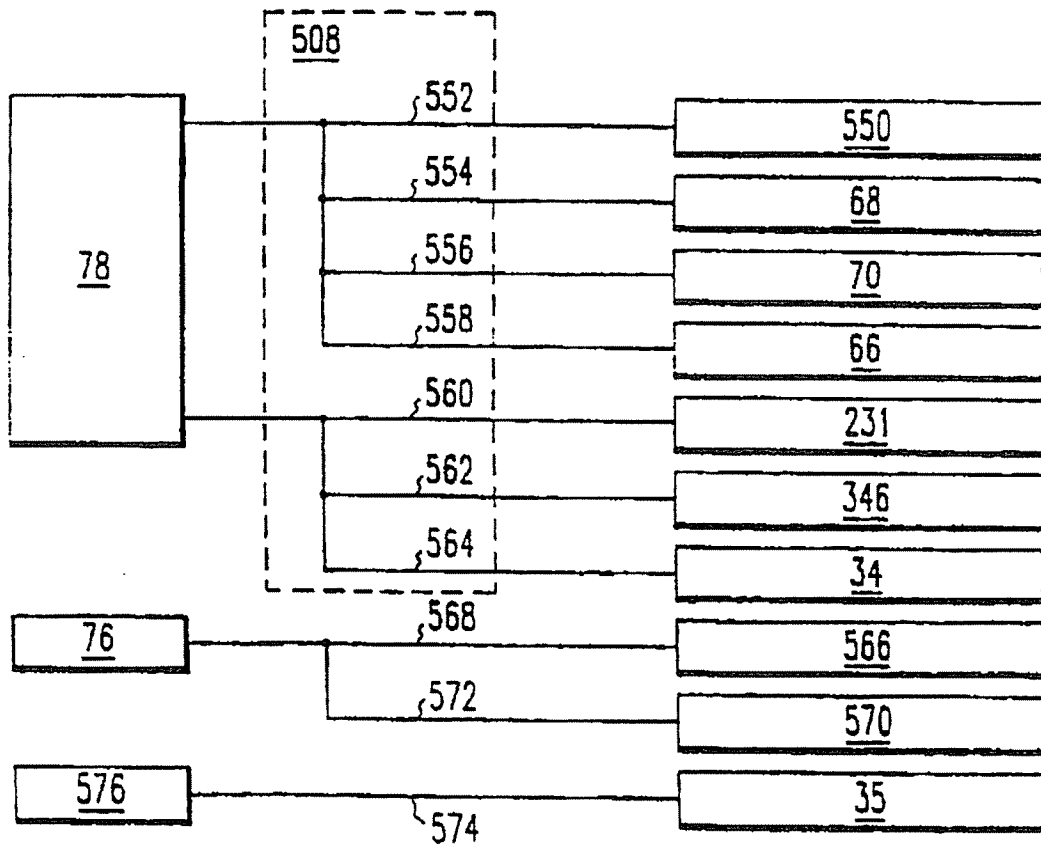
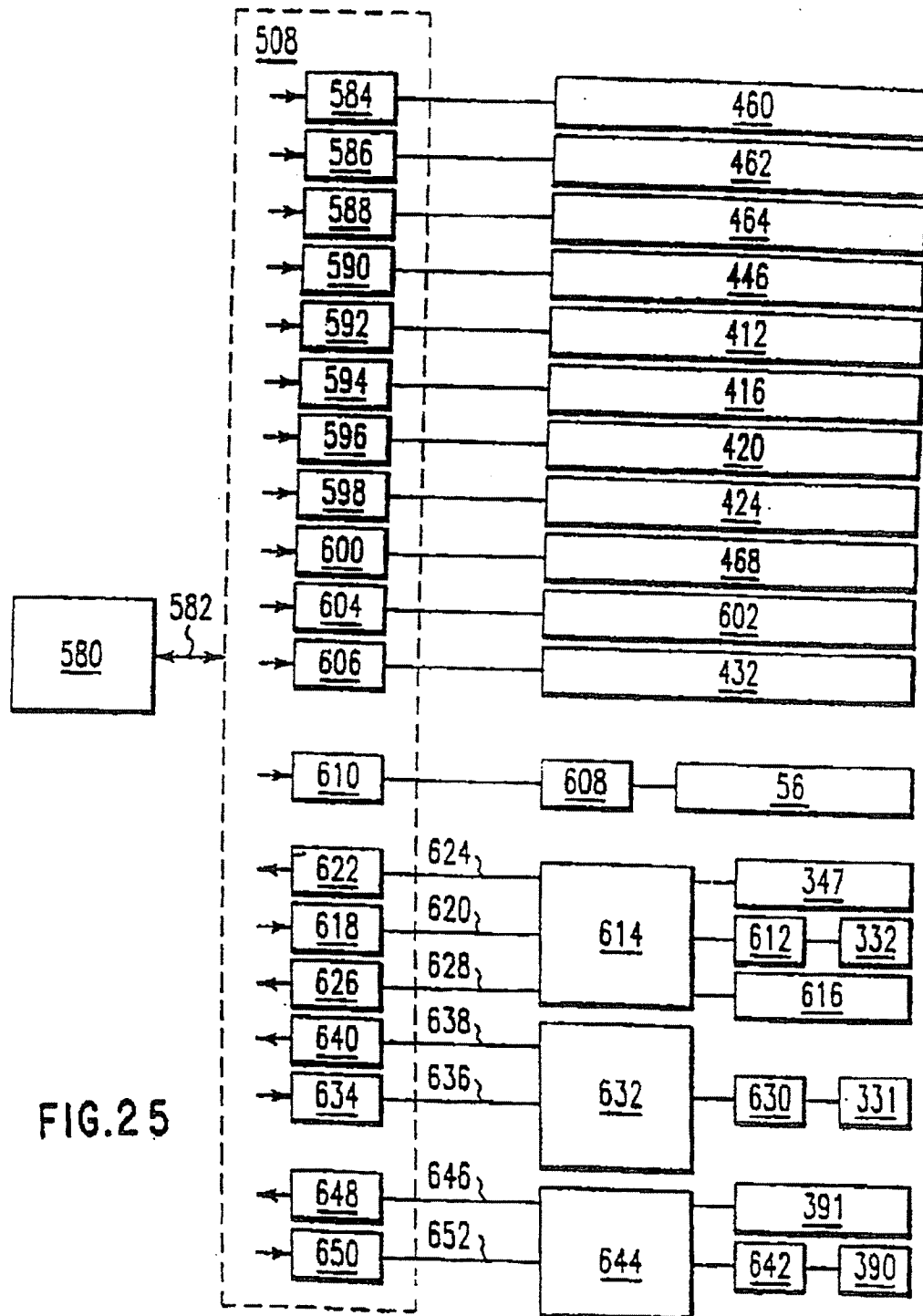


FIG. 24



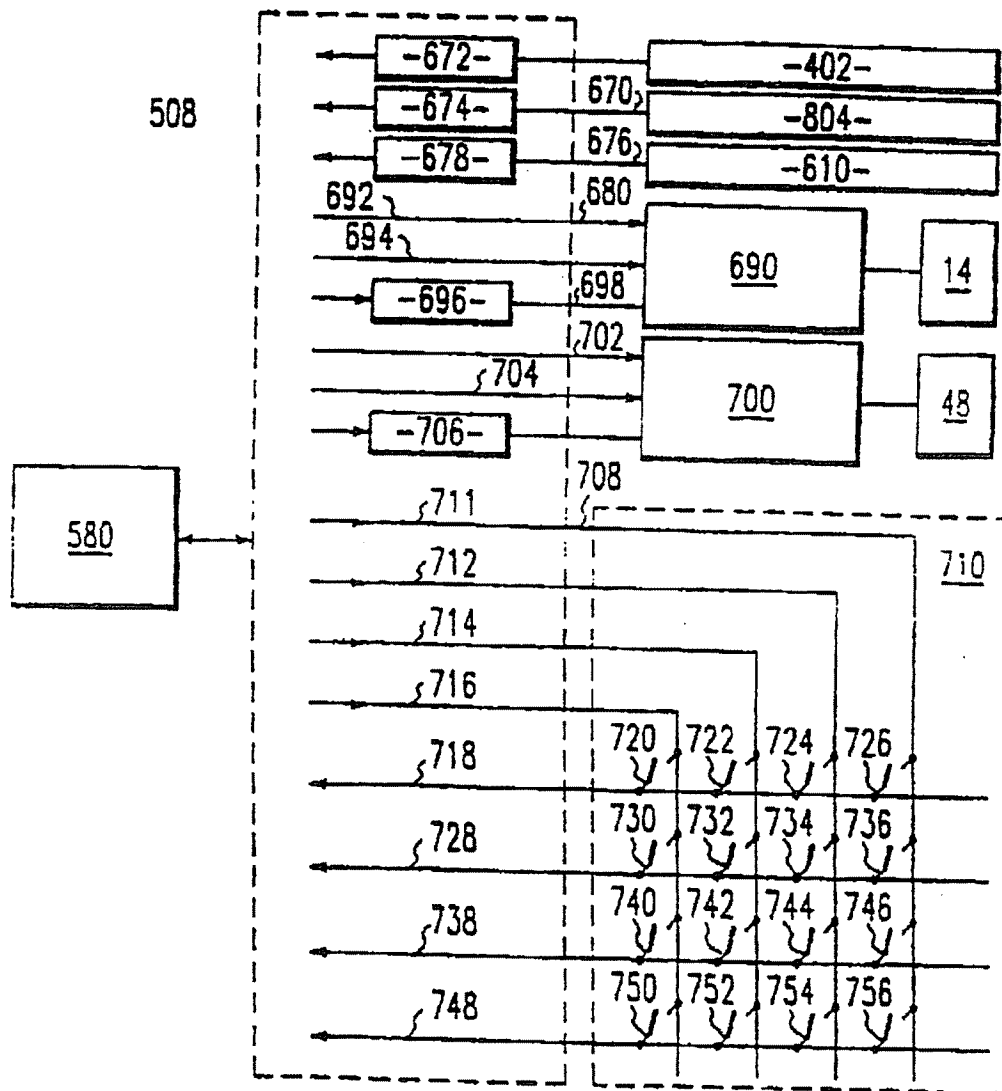


FIG. 26

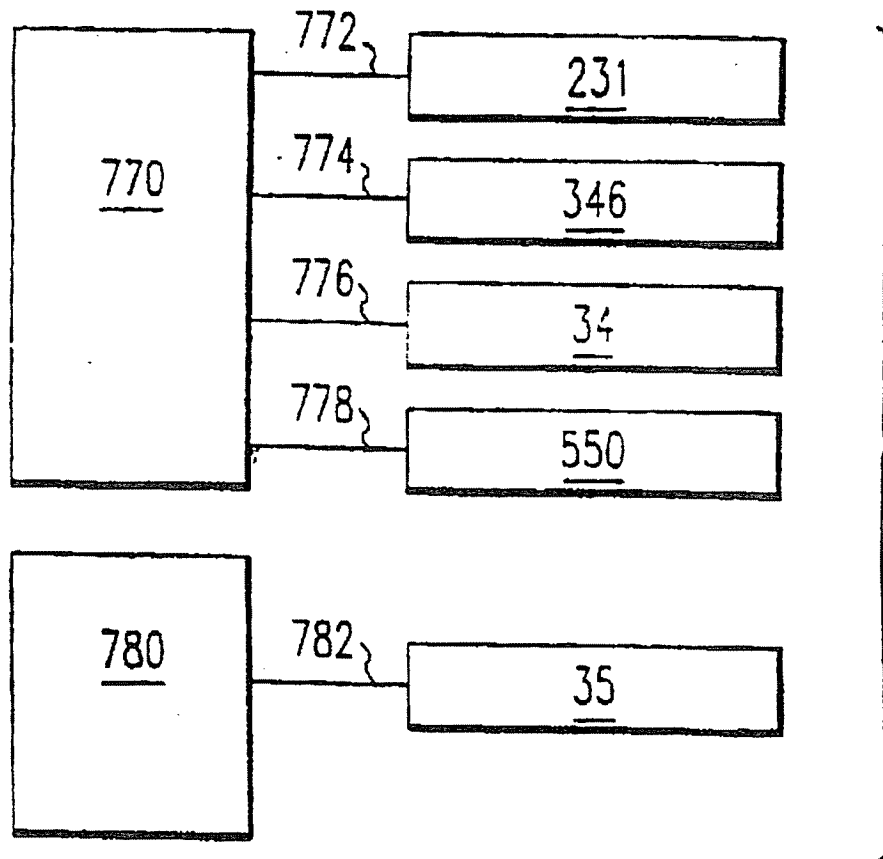


FIG. 27

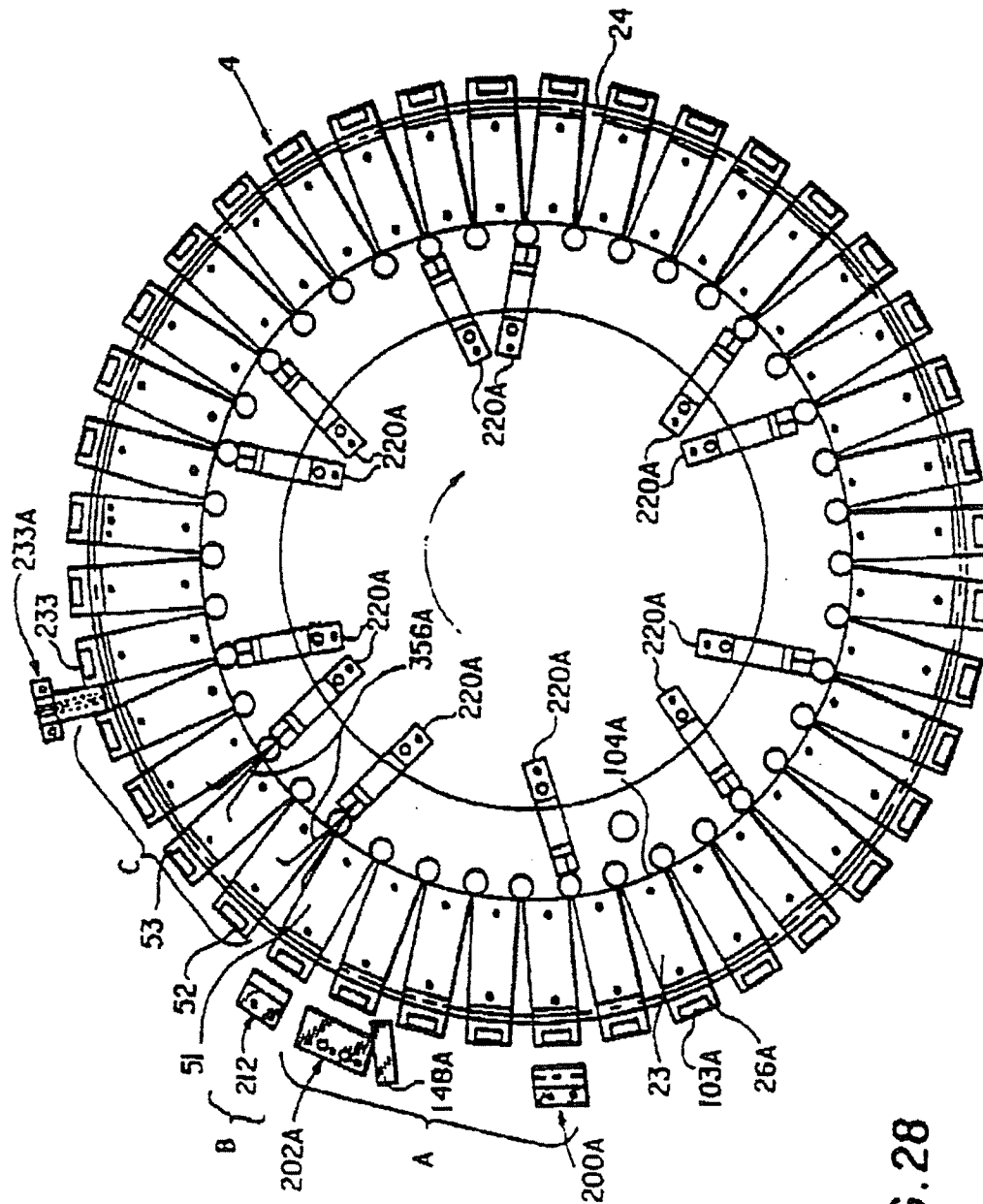


FIG. 28

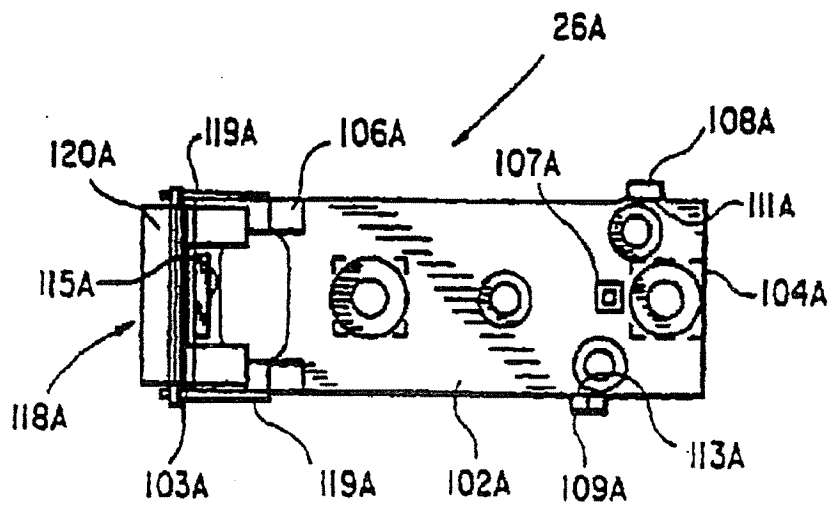


FIG. 29A

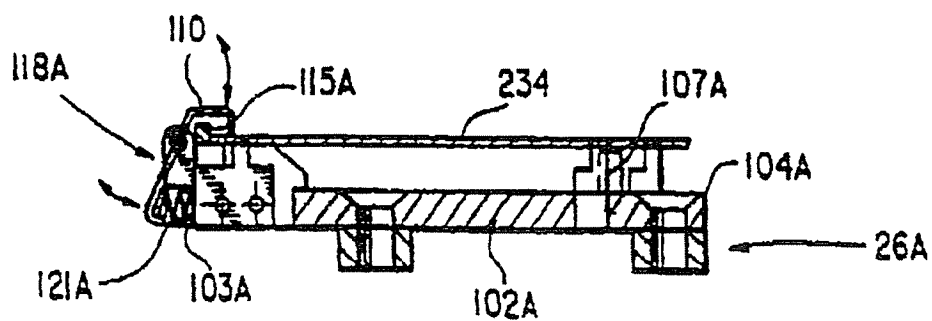
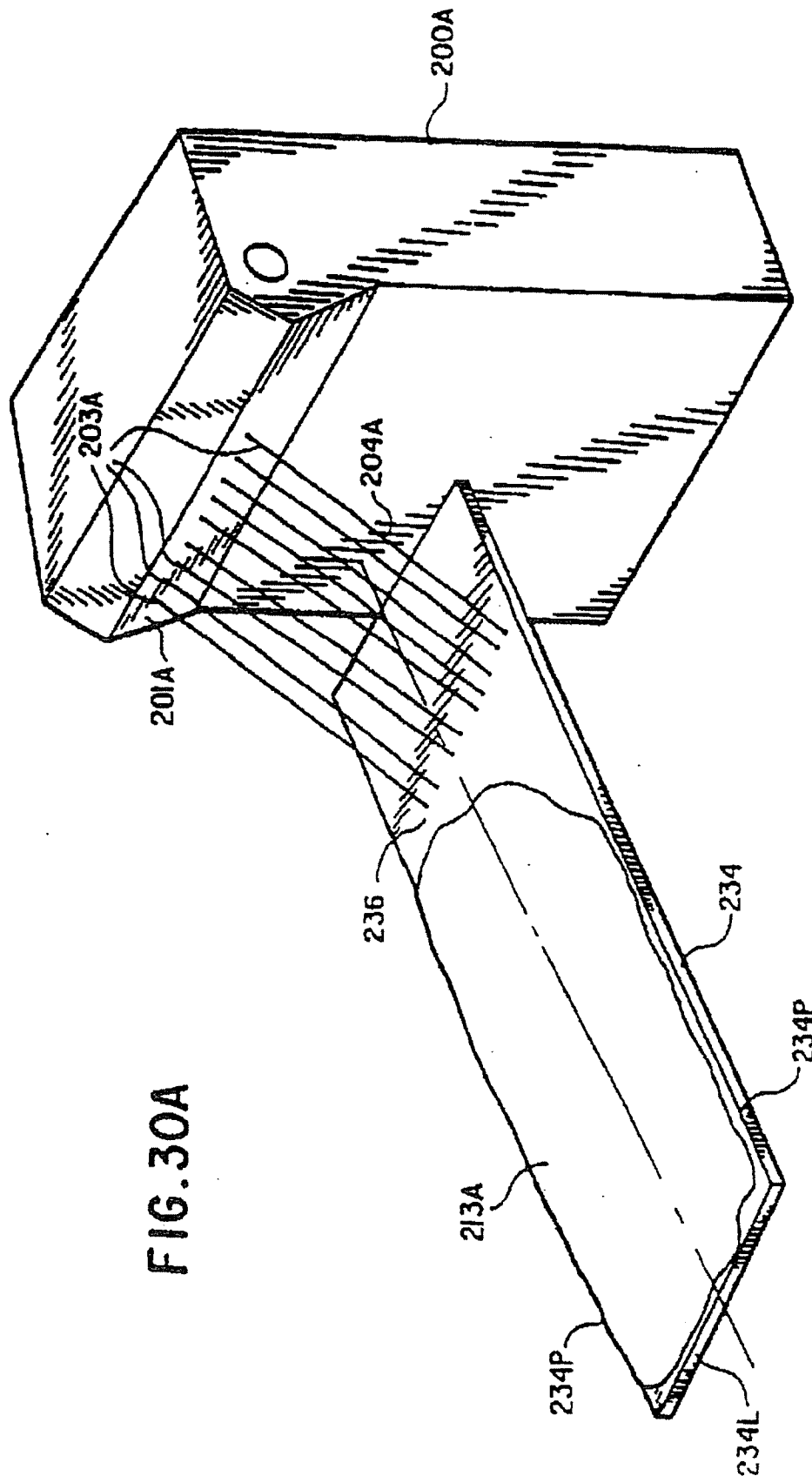


FIG. 29B



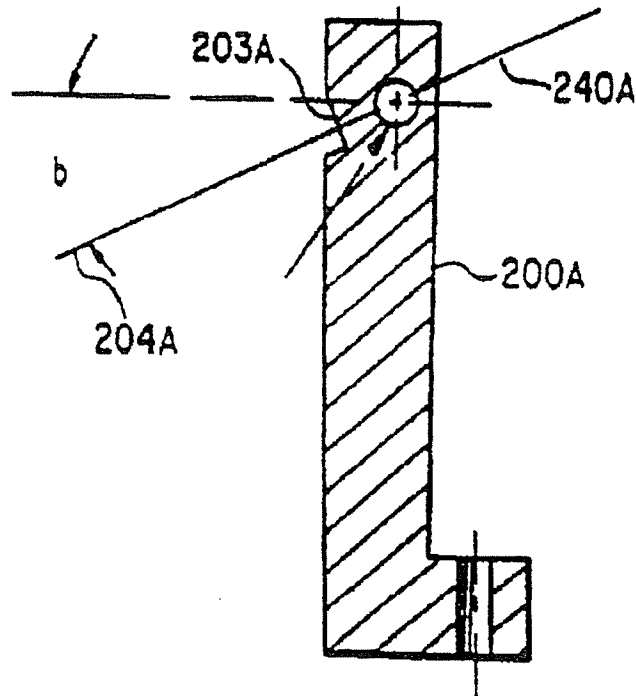


FIG. 30B

